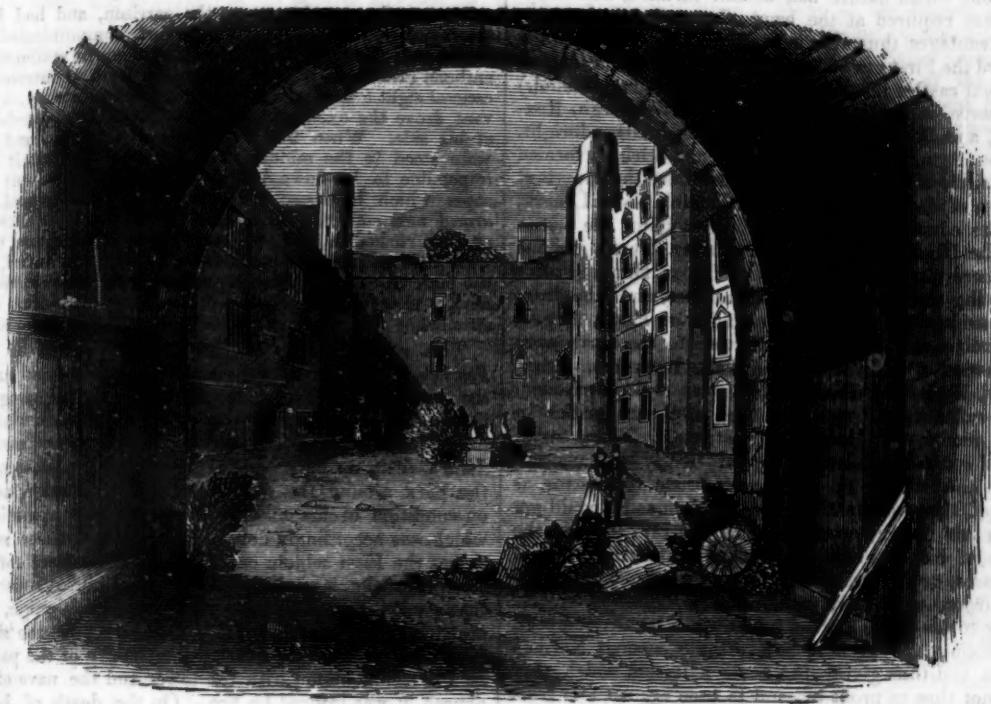


Saturday Magazine.

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ONE PENNY,

THE ROYAL RESIDENCES OF SCOTLAND.



LINLITHGOW PALACE.

THE castles still existing in Scotland, and the more numerous ruins of those which formerly adorned that country, form a very attractive feature in Scottish scenery. The traveller cannot visit the most unfringed scenes, or the remotest glens, without meeting with some grey and venerable relic of former days, reminding him that "the chain of feudal despotism had there planted one of its thousand links." At an early period in Scottish history the number of royal and baronial castles was very great. Of the latter it is said that they raised their formidable towers in every part of the kingdom, on its coasts, islands, peninsulas, and lakes; on the banks of its rivers, and on the crests of its highest mountains; and that many of them rivalled and even surpassed in their strength and extent, the fortresses belonging to the king. Here the Scottish barons of the thirteenth and fourteenth centuries held their residence, surrounded by the numerous class of vassals and retainers, which formed what was called "the following" of their lord. From the interesting picture given by Tytler of the state of society in Scotland at this period, we select the following notice. In the vicinity of these strongholds there was a sufficient extent of ground cleared from wood, to supply by cultivation, abundant provision for the wants of these retainers, who were supported by their lord in a style of rude hospitality characteristic of the period. The produce of his fields and forests, his huge herds of swine, his flocks and cattle, his granaries and breweries, his mills and malting-houses, his dove-cots, gardens, orchards, and "in-field and out-field wealth," all lent their riches to maintain those formidable bands of warlike knights

and vassals, who were ready on every summons, to surround the banner of their lord. Around these castles were also placed the rude habitations and cottages of the more immediate servants and dependants, such as armourers, tailors, wrights, masons, falconers, &c., who administered to the necessities, comforts, or pleasures of the baron. The free farmers also, and the opulent tradesmen of those times, sometimes requested permission to build their houses or booths near the walls of the castle, for the sake of the protection it afforded. For this privilege they paid a small annual sum or rent, and from this practice it appears likely that the towns and royal burghs of Scotland first originated. At this period also upon the large feudal estates belonging to the nobles or to the Church, small villages, or collections of hamlets and cottages, were to be found, which were termed *Ville* in the charters of the times, annexed to which was a district of land called a *Territorium*. This was cultivated in various proportions by the higher ranks of the husbandmen who possessed it, either in part or in whole, as their own property, which they held by lease, and for which they paid a rent.

Thus the greater feudal barons were not only possessed of immense estates embracing within them field and forest, river, lake, and mountain, but of numerous villages from which they received a regular rent, and of whose wealth and gains they always held a share, because they were frequently the masters of the persons and property of the tradesmen and villagers, by whom such early communities were inhabited. In these villages the larger divisions, under the names of caracutes, bovates, and oxgates, were cultivated by the husbandmen,

and the cottars under them, while for their own maintenance each of these poor labourers was the master of a cottage, with a small piece of ground, for which he paid a trifling rent to the lord of the soil.

Such was the condition of society when the stately fortresses of Scotland were in their pride and prosperity. The Royal Castles, built chiefly for strength and resistance during a time of war, were eminently the garrisons of the country, and reared their immense walls, and formidable towers and buttresses, in those situations which nature had herself fortified, and where little was required at the hand of man, but to improve the advantages thus afforded. In the year 1292, when Edward the First gave directions to his captains to deliver the royal castles into the hands of the new king, (Baliol,) there were, on the border, the castles of Jedburgh, Roxburgh, and Berwick; those of Dumfries, Kirkeudbright, Wigton, Ayr, Tarbart, Dumbarton, and Stirling, formed a semicircle of fortresses which commanded the important districts of Annandale, Galloway, Carrick, Kyle, Lanark, and the country round Stirling, containing the passes into the Highlands. Between Stirling, Perth, and the Tay there was no royal castle as far as Dundee; after which the castles of Forfar, Kincardine, and Aberdeen, protected and kept under the counties of Perth, Angus, Kincardine, and Aberdeen. Farther to the north were the castles of Cromartie, Dingwall, Inverness, Nairn, Forres, Elgin, and Banff, which when well garrisoned, were sufficient to maintain the royal authorities in these remote and unsettled districts. These royal castles existed until the war of liberty commenced; but it was the policy of Robert Bruce to destroy as many of the strongholds of the kingdom as he could get within his power; while on the contrary, it was the policy of his opponent Edward to construct additional fortresses, or to strengthen those already existing, for the purpose of overawing the country. This formidable enemy to the Scots erected a number of massive edifices, introducing the architecture of the strong Norman castles, and thus giving the Scots a lesson, which they were not slow to profit by, and to turn against him from whom they learnt it. Tytler says that it was not unfrequent for the siege of a baronial castle to detain the whole English army for weeks, and even months; and although feebly garrisoned, the single strength of its walls resisted and defied the efforts of Edward's strongest machines, and most skilful engineers.

Such being the original strength and importance of Scotland's castles, we propose to gather together such notices of the more majestic among them as may be likely to interest our readers.

I.

LINLITHGOW PALACE.

Of all the palaces so fair,
Built for the royal dwelling,
In Scotland far beyond compare
Linlithgow is excelling;
And in its park in jovial June,
How sweet the merry linnet's tune
How blithe the blackbird's lay!
The wild buck barks from ferny brake,
The coot dives merrily on the lake,
The saddest heart might pleasure take
To see all nature gay.

SIR WALTER SCOTT.—*Marmion.*

No one, (says Dr. Jamieson,) can view the beautiful lake of Linlithgow, or the lofty trees, the sheltered avenues and handsome pleasure-grounds in its vicinity, together with the magnificent ruins of the royal residence of Scotland's ancient kings, without feeling the force of the description given of this interesting scene by the national bard.

Linlithgow is a place of great antiquity and interest. The site of the present palace was probably occupied by the Romans as a station. David the First had a castle here and a grange, as appears from a charter granted by

him to the monks of Holyrood House. Edward the First during his usurpation of supreme authority in Scotland, built a stronghold here about the year 1300, which was called the *Peel* or *Peel*, and during the winter of 1301 that monarch made Linlithgow his head-quarters. On settling the kingdom and retiring to England in 1305 he left the Peel garrisoned under the charge of Peter Lubard. But the patriotic spirit of Bruce had transfused itself into the peasantry of the country, and one of their bold deeds was the capture of the Peel by a curious device of a peasant named Binny.

Binny, who was known to the garrison, and had been employed in leading hay into the fort, communicated his design to a party of Scottish soldiers whom he stationed in ambush near the gate. In his large wain he contrived to conceal eight armed men, covered with a load of hay, a servant drove the oxen, and Binny himself walked carelessly at his side. When the drawbridge was raised, and the wain stood in the middle of the gateway, so that it was impossible to let down the portcullis, the driver cut the ropes which harnessed the oxen, upon which signal the armed men suddenly leapt from the cart, the soldiers in ambush rushed in, and so complete was the surprise, that, with little resistance, the garrison were put to the sword, and the place taken. Bruce amply rewarded the brave countryman, and ordered the castle and its strong out-works, constructed by Edward the First, to be immediately demolished.

This castle appears to have been rebuilt by the English during their short occupation of Scotland under the minority of David the Second. In his progress through the kingdom, about the year 1350, David wishing to be suitably accommodated at Linlithgow granted to John Cairns, an inhabitant of the town, the life-rent of the park around the castle, containing fourteen acres, on condition of his making the necessary reparations: which was accordingly done, although in inferior style. James the First seldom occupied it; but several of his coins bear the legend "Villa de Linlithe." It is said that a mint was established here during his reign, and that the groats issued from it were made of the silver found in a mine at the southern extremity of the parish. In 1424, in common with the tower and the nave of the church, it was injured by fire. On the death of James the Second, his queen dowager, Mary of Gueldres, to whom the estate of Linlithgow belonged as dowry, gave orders, by a warrant from the privy seal, dated 1460, that the apartments, formerly occupied by David Bruce, should be prepared for the reception of the unfortunate Henry the Sixth of England, when driven from his kingdom by Edward the Fourth. James the Fourth preferred it to all his other residences, and built its eastern side. James the Fifth also made large additions to it, and when that monarch conducted his consort Mary of Guise to it, she said that "she had never seen a more princely palace;" and ever afterwards preferred this to any others of the king's residences. James the Fifth added the chapel and parliament hall; and James the Sixth completed the grand square by erecting the magnificent apartments on the north. The palace was constructed entirely of polished stone, the walls were ten feet thick, and covered about an acre of ground. In the centre of the area was a fine well, adorned with several statues; and so constructed as to raise the water to a great height. After the union of the two kingdoms, the palace suffered from desertion: a portion of it was repaired for the reception of Charles the First, when he visited Scotland; but his design of visiting this palace was not carried out. It continued habitable until January, 1746. When the royal army was marching in pursuit of the Pretender's forces, Hawley's dragoons occupied the hall on the north side of the quadrangle, and in the hurry of departure forgot to extinguish some huge fires kindled in dangerous situations. The roof was soon in flames, and being covered with lead, such a shower of melted metal was poured down as to preclude any attempt to arrest the conflagration.

In this palace is still pointed out the room in which

the unfortunate Mary, Queen of Scots, was born. From its dimensions the room could not have been a comfortable one in the winter season. It measures fifty-one feet by twenty-one, and sixteen in height. It had three doors communicating with it; and does not seem to have been provided with grates, the fires having apparently been kindled on the hearths. At the time of the birth of this princess, her father, James the Fifth lay on his death-bed at Falkland, and on being told that a daughter was born to him, he instantly thought of his throne, and of the alliance which had brought it to the Stuarts, and exclaiming, "Is it so? Then God's will be done! It came with a lass, and it will go with a lass;" he turned his face to the wall and expired in grief. On each side of Queen Mary's apartment is pointed out an audience room or hall, the carvings of which must have been very fine, although now much defaced.

The original entry to the palace was from the east, but it is commonly believed that it was changed by James the Fifth by means of a draw-bridge to the south. He also, (says Sir A. Seton,) built those two magnificent porches of approach, on the outer of which the badges of the orders of St. Michael, the Golden Fleece and Garter, conferred on him by France, Spain, and England, together with his own order of the Thistle, are cut in large medallions over the gate. For he revived the order of the Thistle, and in the choir of the church erected marble stalls for the knights, and a throne for himself, as sovereign of the order, under a panelled oak ceiling, ornamented and tastefully painted.

The Earl of Linlithgow was hereditary keeper of the palace from the union of the crowns till the year 1715. Up to 1740 this office belonged to the Duke of Montrose. General Glen is said to have had this charge up to the time when the palace was burnt. It now belongs to Sir Thomas Livingston, Baronet, of West Quartier, representative of the Earls of Linlithgow.

In advance of the palace, and nearly at right angles with it, is the church, a superb Gothic structure, now devoted to the presbyterian worship. Here is shown the aisle where an attempt was made to work upon the superstitious feelings of James the Fourth, and to warn him against his fatal expedition to Flodden. A few days before he set out to join his army, while attending vespers in the chapel, a venerable stranger of a stately appearance entered the cathedral, his head was uncovered, his hair parted over his forehead flowed down his shoulders, his robe was blue, tied round his loins with a linen girdle, and there was an air of majesty about him which inspired the beholders with awe. The unknown visitant walked up to the king, and leaning over the reading-desk where he knelt, said, "Sir, I am sent to warn thee not to proceed in thy present undertaking,—for if thou dost, it shall not fare well either with thyself, or those who go with thee. Further it hath been enjoined me to bid thee shun the familiar society and counsels of women, lest they occasion thy disgrace and destruction." The boldness of these words, instead of raising indignation excited awe, and the figure, using neither salutation nor reverence, retreated and vanished among the crowd. Though strict inquiry was made, the affair remained a mystery, but James probably suspecting it to be a stratagem of the queen, who was most deeply opposed to the war, made no change in his purpose. Sir Walter Scott has introduced this circumstance into his *Marmion*, making Sir David Lyndsay the narrator. The following are the concluding lines.

The wondering monarch seemed to seek

For answer, and found none:

And when he raised his head to speak,

The monitor was gone.

The marshal and myself had cast

To stop him as he onward past;

But lighter than the whirlwind's blast,

He vanished from our eyes,

Like sunbeam on the billow cast,

That glances but, and dies.

The armorial bearings of the burgh are a black dog chained to a tree, the origin of which is connected with a curious tradition. The beautiful lake upon which the palace stands, washes on the east the base of a gently sloping hill, and contains a small island, upon which, in remote times, was found a black dog chained to a tree, though there were no visible means of conveying it thither; and from this mysterious circumstance the arms of the burgh are said to have been derived.

The town of Linlithgow consists of a very long street, with a number of lanes. Many of the houses are of great antiquity; some of them having belonged to the knights of St. John of Jerusalem, who had a preceptory at Torphichen, in this county. In front of the town house formerly stood the cross; and at present stands the principal well, a wooden erection, of grotesque appearance.

In conclusion it may be gratifying to state, on the authority of the *Scottish Tourist and Itinerary*, that the fine old palace of Linlithgow is not left to utter ruin. Some partial repairs have lately been made to preserve it from further dilapidation and decay.

A TRAVELLER'S CONCLUSION.

I HAVE, indeed, witnessed much to interest me, both in the works of God and man; but I have also found something to grieve and disquiet me, and nothing that has tended, in the least, to weaken my attachment to my native land. I trust that I am not so censoriously absorbed in the love of my own country, that I can allow no excellence to any other. But, certainly, I have seen no people more happy, no towns and cities more prosperous, than those of England. And if I have passed, in some places, edifices more magnificent, and bolder scenery than any she can boast; yet nowhere have I beheld such neatness and comfort, as, in many of her districts, distinguish the dwellings of the peasantry, nor such noble institutions for the instruction of the ignorant, and the relief of the distressed. But it is in her *religious advantages* chiefly, that Britain surpasses every other land. It is by her sublime and hallowed associations for the diffusion of knowledge, and the promulgation of the Gospel through a benighted world, that she is most of all dignified and adorned. This it is that has made her the wonder and admiration of the globe. Long may she continue to advance in this glorious cause, unspalled by the gigantic forms of misery and vice that meet her in her benevolent career, and heedless of the scoffs of infidelity that pursue her as she passes on. * * * Let her pour the balm of the Gospel into the wounds of bleeding nations. Let her plant the tree of life in every soil, that suffering kingdoms may repose beneath its shade, and feel the virtue of its healing leaves, till all the kindred of the human family shall be bound together in one common bond of amity and love, and the warrior shall be a character unknown but in the page of history.—*Letters from France, &c., by THOMAS RAFFLES.*

ON approaching water, I had an opportunity of observing that the worst characters have least control over their appetites in cases of extreme privation. It was a standing order, which I insisted on being observed, that no man should quit the line of route to drink without my permission. There was one, notwithstanding, who never could in cases of extremity resist the temptation of water, and who would rush to it regardless of all consequences. Now it happened finally that this man continued to be an irreclaimable character, and six years after this journey he had lost all the advantages he had gained by his services on this occasion. (For the man was a convict and had been permitted to encounter the dangers of discovery in the interior of Australia as a means of regaining, partially at least, his freedom.)—*MITCHELL'S Australia.*

THERE is but one way to tranquillity of mind and happiness: let this, therefore, be always ready at hand with thee, both when thou wakest early in the morning, and all the day long, and when thou goest late to sleep, to account no external things thine own, but to commit all these to God.—*EPICETUS.*

NOTICE OF A REMARKABLE EXPERIMENT ON THE HUMAN EYE.

I.

A very beautiful and interesting experiment may be performed with the human eye, by which a portion of its internal structure becomes visible to the observer himself. This experiment is well known to scientific men, but many of our readers are doubtless unacquainted with it. In explaining the method by which this remarkable appearance may be produced by almost any person who patiently uses the means to bring it before his sight, we must first remind our readers of the beautiful substance which invests the back part of the eyeball, and which is known by the name of the *retina*, or net-work membrane. This delicate and almost transparent membrane is spread all over the hinder portion of the ball, extending as far as the dotted line extends in the accompanying figure, which gives a side view of the eyeball.

Fig. 1.



C, the cornea,
I, the iris,
P, the pupil,
L, the crystalline lens.

The membrane itself is nothing more than an expansion of the optic nerve, (N.) which comes from the brain, and enters the back of the eye at the point above represented. By means of the optic nerve and the retina, impressions are conveyed to the brain, and sight is produced, so that if the optic nerve were severed, blindness would immediately ensue. But on the present occasion it is not our purpose to treat of the wonders of the eye, except as they relate to the single fact which we desire to make more generally known. It is sufficient to say that the retina, or net-like membrane, is traversed by innumerable blood-vessels, forming branches and ramifications of great beauty and delicacy.

Now the fact we have to state is this: the blood-vessels of the retina, although they are (as we have shown) spread over the back of the eyeball, may yet be distinctly seen by the individual himself on his adopting certain simple means to that end.

In a room where there is only one candle let the person close one eye, or shade it with his hand, and then taking the candle, move the flame slowly upwards and downwards within a distance of two or three inches from the open eye. Let him, at the same time, look steadily forwards, *not* at the flame, nor at any particular object, but steadily in one direction, while the flame is kept a little on one side, and not exactly in the field of vision. If these directions are exactly observed, and the candle kept constantly in motion without removing it to a greater distance than we have named, a slight sense of dimness gradually comes over the eye, and at a short distance in front, there begin to appear a number of branches, corresponding with those of the blood-vessels of the retina, but greatly magnified. With the writer of these remarks the image is produced on the instant that the candle is set in motion, but frequently in other persons the motion has had to be continued for a short time before the image was apparent. These branches are like the leafless boughs of a tree with all the minute twigs and ramifications. They appear to issue from the side where the light is held, and they spread across the field of vision, in pale, but distinct, colouring. The principal branches are of a reddish-brown hue, and all are semi-transparent. The image moves slowly in an upward direction, or opposite to the direction principally given to the candle. The branches seem, according to our

own experience, to be spread out on an exceedingly fine and transparent veil, through which every object in the room is apparent, so much so, indeed, as to interfere in some measure with the principal image. The nearer we can bear the candle to the eye, the more distinctly does the interesting picture come out, and the clearness of the ramifications is, perhaps, better seen against a dark surface than against a light one. That all eyes are not equally susceptible to the image is evident, for it lately occurred in our own presence, that four persons were busily engaged in waving their candles up and down, with a desire to observe this appearance, and while two were gazing, apparently on nothing, with a peculiar fixed look of admiration, and declared that they saw distinctly the phenomenon in question, the other two waved and waved in vain without producing the least effect. The admission of four candles into the room was against the laws under which the best view of the picture may be obtained; but still it *was* seen, and much admired, and descended on, even under those circumstances. Those who succeed in producing this appearance will soon find how much more distinct and beautiful it is when obtained in a dark room, from the light of one candle.

This experiment appears to have originated with Dr. Purkinje, Professor of Physiology at the University of Breslau, who in his original account of the appearance of the vessels as observed by him, gives the following illustrations, which, however, are different from the sketches given by subsequent observers, and convey but a faint idea of the phenomenon. Our fourth figure comes nearer to the truth; but it would be difficult adequately to represent the multitude of beautiful and delicate branchings of the vessels as they are actually displayed to the eye.

Fig. 2.

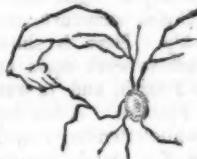
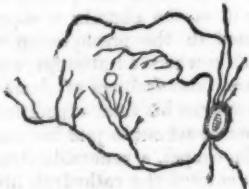


Fig. 3.



It was introduced into this country, a few years ago, by Mr. Wheatstone, and has excited considerable attention among opticians and physiologists. Though with most persons the experiment succeeds readily, yet, as we have already noticed, there are individuals in whom the phenomenon is produced with difficulty, or not at all. It may, therefore, be useful to state a variety of forms under which the experiment may be tried so as, if possible, to enable all persons to enjoy the wonderful spectacle. It may also be proper to remark, for the benefit of persons who feel timid on the subject of these experiments, or who have naturally weak eyes, that no danger is to be apprehended to the sight from the means employed, and that the examination of the blood-vessels of the retina can be performed with less inconvenience than arises from reading in a strong light. It has indeed been stated that these experiments succeed nearly as well on the closed as on the open eye, the difference being scarcely more than may be ascribed to the light which then reaches the cornea by diffusion through the lid. This, however, our own experiments have not enabled us to verify.

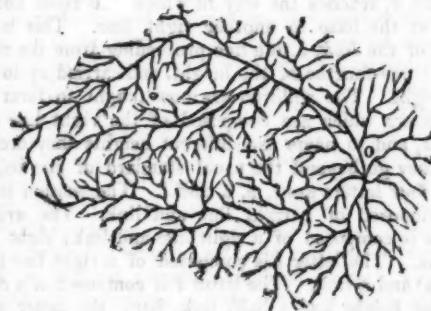
Mr. Wheatstone has constructed a little instrument for showing an original variation of this experiment. It consists of a circular plate of metal, about two inches in diameter, blackened at its outer side, and perforated at its centre with an aperture about as large as an ordinary gun-hole; to the inner face is fixed a similar plate of ground-glass. On placing the aperture between the eye and the flame of a candle, and keeping the plate in

motion so as to displace continually the image of the aperture on the retina, the blood-vessels will be seen distributed as before, but will now appear brighter, and the spaces between the ramifications will be seen filled with innumerable minute vessels, uniting with each other in every direction, which were invisible in the former experiment. In the very centre of the field of vision, there is a small circular space, in which no traces of these vessels appear.

In repeating this experiment, Mr. Horner found that the image of the flame in the focus of a powerful lens was more convenient and effective than the flame of the candle alone. On assisting other persons to observe the appearances in question, Mr. Horner found that the effect was certain, only when the light fell on the ball of the eye without touching the cornea. By applying the light to the exposed ball of the eye in different directions, corresponding portions of the vascular image were brought more distinctly into notice. Thus a light near the right-hand angle of the eye displayed the left-hand portion of the image, and so of the rest. The central parts, within the range of distinct vision, were developed, in every instance, with splendid accuracy and minuteness.

In all experiments with one eye, the comfort of the other eye contributes materially to success. Mr. Horner recommends a case to be bound over it, so as completely to darken it, without touching the eyelids. It has, by all observers, been experienced that a distinct view is not to be maintained, unless the light is kept in motion. The lens must be moved slowly backwards and forwards edgewise, so that the light may traverse the interval between the cornea and the angle or lid of the eye.

Fig. 4.



In fig. 4 Mr. Horner exhibits the result of numerous and varied observations of the vessels of the right eye. The cross (+) indicates the centre of the field of view, or the point of direct vision. Beneath O is the origin of the larger vessels, which in its average situation falls within that point at which the optic nerve enters the ball of the eye. Fig. 5 is an enlarged representation of the more central vessels, and of the peculiar appearance of the central portion of the ground of the picture.

At the centre (+) of the ground of the picture, Mr. Horner found the appearance of a granulated texture in the level surface, like a number of exceedingly minute polished spherules, collected within an obscurely defined circular space, as shown in fig. 5. This circular spot is quite fixed, while the eye continues steady, and, generally speaking, it is quite clear even of the minute vessels, which appear almost equally spread in every other part. But in waving the light over a considerable angular portion of the eye, some of these vessels would intervene between the sight and the central spot, indicating that the vessels and the ground on which they were projected, were on different surfaces. This fact was corroborated by the appearance observed about (O) the origin of the vessels,

which was manifestly on different sides of the base of the optic nerve, according as the light fell far on the inner or the outer angle of the eye.

The first explanation of these remarkable appearances was that the light which surrounds the candle is reflected back upon the retina, either by the inner concave surface of the crystalline lens, or of the cornea, and that the objects are, somehow or other, magnified by these concave surfaces.

According to Mr. Wheatstone the image is evidently a shadow, resulting from the obstruction of light by the blood vessels spread over the retina, but the difficulty is to explain why this shadow is not always visible. To account for this Mr. Wheatstone adduces the known principle that an object, either more or less luminous than the ground on which it is placed, when continuously presented to the same point of the retina becomes invisible, and the rapidity of its disappearance is greater as the difference of luminous intensity between the object and the ground is less, but by continually shifting the place of the image of the object on the retina, or by making it act intermittently on the same point, the object may be rendered permanently visible. Thus whenever the flame of the candle changes its place, the shadows of the vessels fall on different parts of the retina, which is evident from the motion of the figure, while the eye remains still, which is always in a contrary direction to that of the flame. Hence the shadow, being thus made to change its place on the retina, remains, according to the law above stated, permanently visible, but instantly the flame is at rest, the shadow also becomes stationary, and consequently disappears.

In objection to this explanation Sir David Brewster says; "Unless the blood-vessel is placed at a certain distance *in front of the retina*, and consequently in the vitreous humour, it can have no moving shadow, and unless it is within the refracted cone of rays which proceed from the candle, it can have no shadow either moveable or stationary. If the shadow, here referred to, be the shadow produced from the direct light of the candle, then the blood-vessel would appear across the visible flame of the candle, and not at the side of it, in the reddish-brown light."

"The blood-vessels touching the retina will deaden, as it were, the part of the retina which they touch, or make it less sensible to the propagated light, and hence the blood vessels will appear delineated in a fainter light than that which surrounds them. The distinctness with which the ramifications will thus be seen, will vary with the intensity of the brown light, with the ever-changing sensibility of the retina, and with the varying pressure of the blood-vessels themselves."

Speaking of this phenomenon Müller remarks: "By the movement of the candle to and fro, the light is made to act on the whole extent of the retina, and all parts of the membrane which are not immediately covered by the vasa centralia are feebly illuminated; those parts, on the contrary, which are covered by those vessels cannot be acted on by the light, and are perceived, therefore, as dark arborescent figures. The figures of the vessels appear to lie before the eyes, and to be suspended in the field of vision. We have here a distinct demonstration of the axiom, that in vision we perceive merely certain states of the retina, and that the retina is itself the field of vision,—dark in the unexcited, illuminated in the excited condition."

Whatever differences of opinion may exist as to the cause of this phenomenon, we think our readers will not hesitate to pronounce the effect a beautiful one, and to admit that the various wonderful arrangements connected with the eye, and also this particular appearance of a portion of its internal structure, are calculated to awaken our highest admiration, and to raise our thoughts to the Infinite Wisdom which has been here exerted in so conspicuous a manner.

To know God is to have laid the foundation of a firm and intelligent piety: to see Him everywhere, to feel that we are for ever under His government, is to insure the equal foundation of right moral conduct.



THE ART OF WRITING.

V.

ANALYSIS OF MULHAUSER'S METHOD OF WRITING.

In returning to the notice of Mulhäuser's method of teaching writing, (commenced in our last number,) we must first quote the opinion of M. Lebrun, the Director of the Normal School at Versailles. He expresses himself as follows.—

"The art of writing presents two distinct parts: first, the theoretical part, which consists in a rational analysis of the forms of written characters; and secondly, the practical, which gives the means of acquiring with rapidity the habit of forming the characters correctly. Generally, attention has been almost entirely confined to the second part, under the impression that it is useless to reason with children, and that they are to be treated as machines, whose office it is to move, and not to reflect. The author of this new method is guided by an entirely different principle. Nothing is more simple or easy to comprehend than his analysis of writing. The method generally adopted presents a useless multiplication of elementary characters. One method that has been introduced into several schools has seventeen such characters. The author reduces them to four, and from these four elements, which are learnt with the utmost ease, are produced all the letters of the alphabet. The advantage of this simplicity appears unquestionable. The child accustomed to draw the letters with an exactness required by the rule impressed on his memory, cannot write badly if he has paid attention to the instruction."

The Director then proceeds to say that sixty children placed under Mulhäuser's tuition at the Normal School at Versailles, comprehended all his rules and precepts in less than twelve lessons. "Finally," he adds, "I have to report that the trial we have made has had the most successful result, and the method of M. Mulhäuser appears to me every way calculated to ensure and hasten the progress of the children, while his discipline and arrangement of the classes show, in my opinion, a remarkable knowledge of the faults and qualities of infancy. Our schools cannot but profit by the entire adoption of the principles recommended by so experienced and able a teacher."

With this eulogium, passed on the method by an experienced teacher, and one who had seen its working in the schools especially under his superintendance, it is surely worth while to examine more closely into its merits, and not to receive as infallible any wholesale denunciation which interested or prejudiced individuals in this country may be pleased to cast upon it.

Upon a careful review of the method we believe its merits to consist in, *first*, the importance it gives to the *elementary forms* of letters; *secondly*, the *constant demand it makes on the attention* of both teacher and learner; *thirdly*, the *exactness and precision* it requires in the subordinate arrangements, all tending to the principal end in view, *i. e.*, the attainment of a good clear unornamented style of writing.

The first point is undoubtedly that on which much of the success attending this method has been founded. The elementary forms used in writing, with the rules relating to them, are made by Mulhäuser's method, a separate and important branch of study called the "Study at the Circles," because in the use of the method in monitorial schools, the junior pupils take their places in circles around the monitors to receive the first course of instruction. There are fifteen tablets of rules, ten of which are thoroughly taught during this preliminary course. The first tablet relates to the posture of the body, the position of the writing book, and the method of holding the pen. All the rules relating to these points are read aloud by the monitor, and at each rule he pauses to illustrate it, to ask questions on it, and to ascertain whether each of his pupils (they are not to exceed eight) is able to comprehend it. He reads and explains as many of the rules as will occupy fifteen minutes, when the children return to their seats. The second tablet contains the rules relating to the motions of the hand in writing, and the Elementary Lines.

From this tablet the children learn that in writing, all the letters have the same inclination, or lean the same way; that the letters are of different shapes; that their shapes depend upon the motions of the hand; that there are four principal movements of the hand, the downward, the upward, from right to left, from left to right, and that from these four movements there result two sorts of lines, *right lines* and *curved lines*. The children are also taught the four elementary forms, out of which the twenty-six letters of the alphabet are made. These four elementary forms are named the *right line*, the *curved line*, the *loop*, the *crotchet*.

In teaching and illustrating these rules the monitor is supplied with a black board and chalk, for the purpose of making the several lines, &c., and of encouraging the children to imitate him. Thus the children may acquire some facility in expressing the elementary forms before they proceed to the use of slates or writing books.

The third tablet contains the rules relating to the strong full stroke, made by the downward motion of the hand, and called the *right line*. The different heights of which this line is made are particularly noticed, and in order to regulate them, parallel horizontal lines are traced upon the black board, slate, or paper. The space between two of these lines is called a *half-height*; between three of them a *height*; between four, a *height and a half*; between five, two *heights*, &c. The space between three lines (or a *height*) is that of the majority of letters; where the *right line* passes below these parallels it is indicated by the word *down*. The practice of the *right line*, with attention to the space to be left between one *right line* and another, is the employment of the pupils during the explanation of this tablet.

Tablet 4, teaches the way in which one *right line* is joined at the base to another *right line*. This is by means of the *link*, a fine line proceeding from the *right line* at three-fourths of the *height*, and carried up to the *half-height*. The children are now taught to form the four letters which are composed of the *right line* and the *link*, and to name the different heights they occupy when they go beyond the usual standard of *one height*. These four letters are *i*, *u*, *t*, and *l*. The written letter *i* is composed of a *right line* and *link*. The written letter *u* is composed of a *right line* and *link*; *right line* and *link*. The letter *l* is composed of a *right line* (*two heights*) and a *link*. The letter *t* is composed of a *right line* one *height* and a *half*, *link*, *bar*; the latter word being employed in the case of this letter to indicate the cross to the *t*. The children are also referred to the writing models, or engraved plates, where the elementary forms and letters are shown in the order of their simplicity, and strictly in accordance with the instructions contained in the Tablets of Rules. Thus Model IV. consists of letters and words solely formed by the union of the *right line* and the *link*. Model V. of letters and words formed of the *hook*, *right line* and *link*; and so on with the other models. We may here remark that the term *model* is an improvement on the usual word *copy*, as applied to that which the pupils are to imitate. The latter term, though long technically employed, is evidently incorrect.

The next Tablet (No. 5) relates to the means of uniting the upper part of the *right line* to that of another line or letter. This is done by means of the *hook*, a fine line made by an upward movement and a slight turn of the hand until it descends into the *right line*. The letters formed of the *hook*, *right line*, and *link*, are then practised:—these are the written letters, *n*, *m*, *h*, *p*. Tablet 6 introduces the pupil to the *curved lines*, and the corresponding Writing Models show the letters and words which are formed by the union of the *curve* with the lines already learned. The next tablet is also occupied by rules relating to the *curved lines*.

Tablet 8 teaches the form of the *loop* in the written letters *j*, *g*, and *y*, and the method of uniting them with

the previous forms. Writing Models XII. XIII. and XIV. supply abundant examples of the mode of writing these looped letters. Tablet 9 teaches the form of the peculiar mark by which several of the letters are completed, and united to those which follow. This mark is called the *crochet*, and the letters in which it occurs are called the *crotchet letters*. These are the written letters *b*, *f*, *w*, and *r*. The letter *o*, on account of the stroke by which it is terminated in writing, is also placed among the *crotchet letters*. Writing models supply examples as before. Tablet 10, with which the elementary course of instruction is completed, presents the complex letters, or four letters in which there are some peculiarities which do not allow of their being included in any of the former rules. These letters are *k*, *s*, *x*, and *z*, in the exercise of which, the pupils are referred to writing models as in previous instances. During this preliminary course of instruction, the pupils are not confined to the study at the circles, although fifteen minutes are always employed in this way as a preliminary step to the other department. As they advance, and become expert in forming the elements on the board, they proceed to join the lower division of the general classes, or that in which the scholars write on slates, and thus commence the "Study at the Desks."

The foregoing description will show that Mulhäuser's method is very gradual in the steps by which it leads children to the knowledge of this art, and that it gives to the elementary forms of letters an importance and distinct utility which is recognised in every subsequent exercise.

We now proceed to the second point which strikes us in this method, i. e., the *constant demand it makes on the attention* of both teacher and learner.

It will be seen above that, during the whole of the preliminary course of instruction, the teacher (or the monitor, if it be a monitorial school) is called upon to state every rule in distinct terms, and to illustrate it by the forms he draws on the black-board, teaching the children to imitate what he sets before them. From his lips the children learn to give their proper names to the different forms, and from his dictation they afterwards write those forms on the board, or slate. In going through the numerous rules contained in the tablets, there is always something new for the teacher to impart and the pupils to acquire, and the method cannot be carried on without attention on both sides. This is very different to setting a copy before a child, with a few general directions, and letting him imitate it according to his own ideas, with the knowledge, perhaps, that any errors he may commit are very likely to escape notice among the numbers the master has to superintend.

The plan of writing from the dictation of the elements, which is one, we believe, quite peculiar to Mulhäuser's method, is also highly advantageous, both in keeping up the interest of the scholars, and also in reminding them constantly of the elementary forms on which the whole of their instruction has been grounded. This dictation from the elements is intended to form part of the daily lessons, though not to supersede the imitation of the models. It is difficult to give the reader an idea of it without oral communication, yet we would willingly make known this plan, by which, as M. Lebrun observes, "the attention of the pupils is secured by an allurement resembling a game." If what we have said in definition of the elementary forms has been understood, let the reader draw five horizontal lines wider apart than those employed in music, and taking the three lower lines as the *height*, or space occupied by the smaller letters, let him write the little word of which we thus dictate the element: right line link; right line two heights link; right line two heights link. This will illustrate Tablet 4. Then let him proceed to the next step, in which the hook is added, and write the word of which the following

are the elements:—hook right line, hook right line, hook right line link; right line link; right line two heights link; right line two heights link. The first example is a word of three letters, the second a word of four letters, and we have used a semi-colon to mark the end of each letter. Perhaps it is hardly fair to expect that the slight sketch we have given should enable the reader to write from the elements as above; if so, we must refer him to the Manual itself, which will make the method of doing so perfectly clear. This sort of exercise will constantly bring back the advanced classes to the elementary forms, while it will afford amusement to the junior classes, and facilitate their progress. That the letters may all have the same inclination, and that the spaces between them be properly preserved, diagonal as well as horizontal lines are employed during the early lessons. These guides for the weak and wavering lines of beginners are gradually omitted as the pupil advances so far as to be able to dispense with them.

It remains now to notice the *exactness and precision* required by this method. These pervade all the minor arrangements, as well as the more important, and are such as can only be estimated justly by those who have the laborious task of teaching two or three hundreds, instead of some few dozens of children. The teacher of some thirty or forty boys, may smile at the idea of giving signals for each movement of the class, even to the simple act of taking up the pen; but the master of a national or other school will be thankful for every suggestion, however trifling it may appear, which shall assist him in the difficult task of keeping order among hundreds of children who have had but little home discipline, and are therefore unruly, and only to be quelled by regulations that partake of military precision. Such a teacher will see the full use of every direction contained in this Manual. The marching order, the filing off in divisions, the words of command, &c., are things with which he is familiar, and which he finds it necessary to adopt on most occasions. Their applicability to the writing classes will not be questioned by him.

Mulhäuser's method is not, however, to be considered as applicable only to the instruction of large masses of scholars. It will be found equally advantageous in private instruction, and to this end we find directions given in the same Manual; indeed, with no other apparatus than the Manual and a few writing books properly ruled, the parent or teacher may conduct his children through the whole of the elementary course of instruction, for the Writing Models and Tablets of Rules are bound up with the Manual, thus rendering it complete in itself.

In closing our account of this method, we must remark that it leads to the acquirement of good legible writing, but entirely without ornament. The day of flourishes and elegant devices in writing has passed away, and that system of writing is now the most approved which unites dispatch with purity of form and perfect legibility.

It has been said that the English surpass all other nations in this art; but is this *generally* the fact? If we have high examples of skill, have we not a widely prevalent neglect of good writing, and are not the lower orders especially deficient in the power of writing legibly, if they can write at all? It is not an art to be despised even by the most accomplished person, though we find a strange affectation of writing illegibly among some that could do better. The testimony of many eminent men might be adduced in favour of a good hand-writing, but our space will not allow us to select more than two.

Locke says that "the quicker a man writes, the slower others read what he has written; this being a remark that may concern the writers of books as well as letters."

Dr. Parr wrote a worse hand than most of his contemporaries. In his preface to the *Characters* of Fox, of which he was the editor, he confesses to have expe-

rienced frequent and serious inconvenience from his early and perverse inattention to his hand-writing; and after quoting a passage from Quintilian in praise of the usefulness of the art, he speaks of himself in these remarkable words:—"The editor unfortunately accustomed himself '*velociter scribe non bene*', and often has he been induced by his own painful experience to recommend Quintilian's observation to young men, who conscious of their natural talents, and their literary acquisitions, were disposed to slight good penmanship as below the notice of a scholar. He has sometimes wished that it had been his own lot to aspire to the calligraphy of the Antiquarii, or the united accuracy and rapidity of the Notarii, whom Scaliger describes in his learned remarks upon Ausonius. Those wishes must now be unavailing. But he hopes to put some check upon the boyish heedlessness, or petty vanity of other men, by reminding them that in the art of writing Mr. Fox was eminently distinguished by the clearness and firmness, Mr. Professor Porson by the correctness and elegance, and Sir William Jones by the ease, beauty and variety of the characters which they respectively employed."

CRAFTY men contemn studies; simple men admire them; and wise men use them; for they teach not their own use; that is a wisdom without them; and won by observation. Read not to contradict, nor to believe, but to weigh and consider. Some books are to be tasted, others to be swallowed, and some few to be chewed and digested. Reading maketh a full man, conference a ready man, and writing an exact man. And therefore if a man write little, he had need have a great memory; if he confer little, have a present wit; and if he read little, have much cunning to seem to know that he doth not. Histories make men wise, poets witty, the mathematics subtle, natural philosophy deep, morals grave, logic and rhetoric able to contend.—BACON.

THE average mortality of any given country is less fluctuating than the mean temperature of its climate, and the remark holds good with respect even to violent deaths, and yet upon how many tumultuous passions, wayward thoughts and states in man, and upon what multiplied circumstances, does each death, murder, and fatal accident, depend! Not only, then, must the same moral and physical causes be in constant operation, but the annual amount, or force of each, taking one year with another, will not vary to any considerable extent.—*Medical Review*.

CIVILIZATION is inherent in the nature of man, one of whose distinguishing characteristics is *sociability*. It is compounded, like all human things, of good and evil; but the advantages far outweigh the disadvantages. It is our duty to strive to meliorate it, to diminish the evils which it has produced, or which are attached to it, and to augment the benefits which it is capable of diffusing over the whole human race. The division and employment of men are not only the two principal effects, but in their turn the most important causes of civilization and its advancement. Our civilized society consists of two great classes. One comprehends the idlers, or those who do nothing for themselves, but live by the labour and toil of others, and in politics as in morals it is a great evil not to do good, and every useless citizen may be considered as a pernicious man. The other class is that of the active and industrious members of society. This is subdivided into two parts, one consisting of persons whose labour and activity produce beneficial results, the other including those whose employments are barren and fruitless, nay often detrimental.

In our civilized societies we cannot reckon that more than one-twentieth of the persons composing them are engaged in really productive occupations. This twentieth has to feed, support, direct, and control, by its labour, the other nineteen-twentieths, composed of the useless idlers, the pernicious labourers, and the unproductive individuals. Let us establish a new proportion beneficial to society; let us exert our skill to direct to a useful purpose that individual and general activity, which is too often ill-managed and unprofitably applied; let us form an immense mass of well-combined efforts, and augment our powers a hundred-fold by employing them better.—*Art of Employing Time*.

ECONOMY OF LICHENS.

THE first conquest of life over matter, the first inroads of fertility on barrenness, are made by the smaller lichens, which, as Humboldt has well observed, labour to decompose the scorched matter of volcanoes and the smooth and naked surfaces of sea-deserted rocks, and thus to "extend the dominion of vitality." These little plants will often find a footing where nothing else could be attached. So small are many, that they are invisible to the naked eye, and the decay of these, when they have flourished and passed through their transient epochs of existence, is destined to form the first exuvial layer of vegetable mould; succeeding generations give successive increments to the soil thus forming, from which men are to reap their harvest, and cattle to derive their food; from which hereafter forests are designed to spring, and from which future navies are to be supplied.

But how is this frail dust to maintain its station on the smooth and polished rock, when vitality has ceased to exert its influence, and the structure that fixed it has decayed? This is a point which has been too generally overlooked, and yet which is the most wonderful provision of all; the plant, when dying, digs for itself a grave, sculptures in the solid rock a sepulchre in which its dust may rest. For chemistry informs us that, not only do these lichens consist in part of gummy matter, which causes their particles to stick together, but that they likewise form, when living, a considerable quantity of oxalic acid; which acid, when by their decay set free, acts upon the rock, and thus is a hollow formed in which the dead matter of the lichen is deposited. Furthermore, the acid, by combining with the limestone, or other material of the rock, will often add an important mineral ingredient to the vegetable mould; and not only this, the moisture thus conveyed into the cracks and crevices of rocks and stones, when frozen, rends them, and by continual degradation, adds more and more to the forming soil. Successive generations of these bond-slaves indefatigably perform their duties, until at length, as the result of their accumulated toil, the barren breakers, or the pumice plains of a volcano, become converted into fruitful fields.—BUNNETT'S *Outlines of Botany*.

NATURE presents throughout her works an illustration of the important, but little heeded, truth, that everything is mutable here below. What we call our own, and those objects around, with which we hold the most familiar acquaintance, perish in the use; and no man, however sceptical he may be with regard to the truths of religion, will dare to deny the evidence of his senses. Not only powerful empires have sunk into oblivion, and the most stupendous works of art been swept into the gulf of destruction; even mighty rivers have shifted their beds and become shallows, and vast mountains have presented manifest proofs of revolution and decay. While then we are looking forward ourselves with a certain, though trembling, assurance of our own dissolution, and while we behold on all sides the manifest traces of change, why should it be deemed incredible that the earth itself will die, and give place to another state of things? Time, the measure of the mundane system, compared with the immensity of the universe, is but as the span's breadth of man's existence, to the eternity that is expanded before him! Fluctuation is perceptible in every part of Nature which comes under our inspection; and though our contracted period, and narrow observation, prevent us from seeing with equal clearness the changes which take place in the whole system, there can be no just ground to suppose, that a frame is immutable which is made up of materials continually altering their situation and appearance.

But what reason leads us to conclude from enquiries and experiments properly conducted, revelation stamps at once with the unerring decision of its Divine Author. The Holy Scriptures make it throughout a prominent object to convince us of this great truth, that all visible things are mutable, and that the succession of time is only a stream that leads us to Eternity.—BASELEY.

RELIGIOUS controversy has often been made interesting to the public, when it was strongly seasoned with gross abuse, slanderous misstatements, amusing or romantic narrative, wit, sarcasm, highly wrought eloquence, or other attractions which the public taste admires. But religious argument, composed with sobriety, and put forth in the spirit of truth and peace, has no right to expect popular favour.—BISHOP HOPKINS.